

Interior Of the Earth

Exercise

Q. 1. A. Tick (✓) the correct options in the box

There are two layers in the crust.

A. Inner and outer crust

B. Continental and oceanic crust

C. Surface and oceanic crust

D. Mantle and Core

Answer : The crust is the outermost layer of the earth's surface. It exists in a solid state. It is classified into two layers based on chemical composition. The continental crust is made up of silica and aluminium, whereas, the oceanic crust is made up of silica and magnesium.

Q. 1. B. Tick (✓) the correct options in the box

Which element is found in both mantle and crust?

A. Silica

B. Magnesium

C. Aluminium

D. Iron

Answer : Silica is the most abundant material found in both crust and mantle.

Mass percentage of silica in Crust = 60.6%

Mass percentage of silica in Mantle = 44.71%

Q. 1. C. Tick (✓) the correct options in the box

Which of these minerals are found in the core of the earth?

A. Iron-magnesium

B. Magnesium-nickel

C. Aluminium- Iron

D. Iron-nickel

Answer : The Core is the innermost layer of the earth. Iron and Nickel are the predominant materials found in this layer.

Q. 1. D. Tick (✓) the correct options in the box

The inner core is in which state?

A. Gaseous

B. Solid state

C. Semi-solid state

Answer : The Core is the innermost layer of the earth. It consists of 2 parts – inner core and outer core. The inner core is in solid state and outer core is in liquid state.

Q. 1. E. Tick (✓) the correct options in the box

The outer core is made up of

A. Iron

B. Gold

C. Hydrogen

D. Oxygen

Answer : The Core is the innermost layer of the earth. It consists of 2 parts – inner core and outer core. Outer core mainly consists of Iron. Liquid iron in the outer core is also responsible for the generation of magnetic field. North and South Poles exist because of the liquid outer core.

Q. 1. F. Tick (✓) the correct options in the box

The layer of the earth on which we live.

A. Mantle

B. Core

C. Crust

D. Continental crust

Answer : Earth's interior is classified into many layers. The crust is the outermost layer of the earth's surface. The crust is divided into continental crust and oceanic crust. Thus, the layer in which we live is continental crust and the remaining is oceanic crust.

Q. 1. G. Tick (✓) the correct options in the box

Which seismic waves can travel through liquid medium?

A. Primary waves

B. Secondary Waves

C. Surface waves

D. Oceanic waves

Answer : Seismic waves are the waves of energy caused by the sudden breaking of rock within the earth. Seismic waves can be classified into body waves and surface waves. Body waves can be further classified into primary waves and secondary waves. Primary waves can travel through any medium, whereas, secondary waves pass through solid medium only.

Q. 2. A. Tell whether right or wrong. Correct the wrong statement

The density of various materials is not the same in the interior of the earth.

Answer : True

Density of various materials differs in the interior of the earth. The core is denser than mantle and crust.

Q. 2. B. Tell whether right or wrong. Correct the wrong statement

The core of the earth's interior is made up of hard rock

Answer : False

The outer core is made up of a liquid state and inner core is made up of solid state.

Q. 2. C. Tell whether right or wrong. Correct the wrong statement

Secondary waves cannot pass through outer core.

Answer : True

Secondary waves are a type of seismic waves. They can travel through solid medium only. The outer core is made up of liquid state. Hence, secondary waves cannot pass through outer core.

Q. 2. D. Tell whether right or wrong. Correct the wrong statement

Continental crust is made up of silica and magnesium

Answer : False

The continental crust is made up of silica and aluminium. Oceanic crust is made up of silica and magnesium.

Q. 3. A. Answer the following

What are the two parts of the crust? What is the basis of classification?

Answer : Earth's crust is the outermost layer. It can be classified into Continental crust and oceanic crust, on the basis of chemical composition. The continental crust is made up of silica and aluminium. Oceanic crust is made up of silica and magnesium.

Q. 3. B. Answer the following

Why is the upper mantle called the asthenosphere?

Answer : The Mantle is the layer beneath the earth's crust. It consists of two layers: upper and lower mantle. The upper mantle is called asthenosphere, "astheno" is a Greek word meaning 'weak'. It is called weak layer because it is in liquid state where rock material deforms more readily, and magma formation takes place.

Q. 3. C. Answer the following

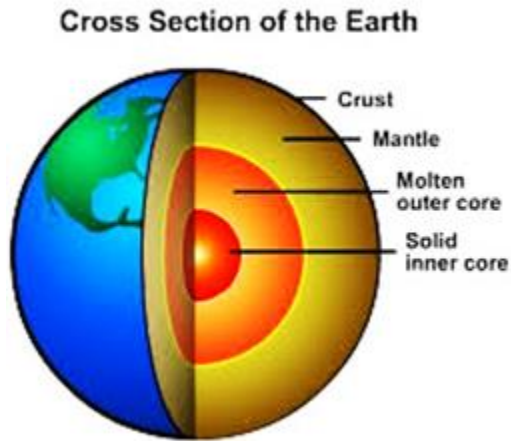
Magnetosphere of the earth is a result of rotation. Explain.

Answer : The magnetosphere is the region of space surrounding earth where the dominant magnetic field is the magnetic field of Earth, rather than the magnetic field of interplanetary space. Earth's magnetic field is developed due to a phenomenon called dynamo effect. It means the generation of a magnetic field due to rotating current. This electric current is a result of the spiral eddies generated due to earth's rotation and vertical currents formed due to the temperature difference between the outer core and inner core.

Q. 4. A. Draw neat diagrams, label them and explain.

The interior of the earth.

Answer :



Earth's interior is classified into different layers.

The crust is the outermost layer of the earth's surface. It is divided into continental crust and oceanic crust. It exists in a solid state. The continental crust is made up of silica and aluminium, whereas, the oceanic crust is made up of silica and magnesium. It is the thinnest of all layers when compared to mantle and core. The thickness of the crust varies. Continental crust is thicker than oceanic crust. The crust comprises large plates of land called tectonic plates. The movement and interaction of these tectonic plates are responsible for mountain formation, fertile plains, volcanic eruptions etc.

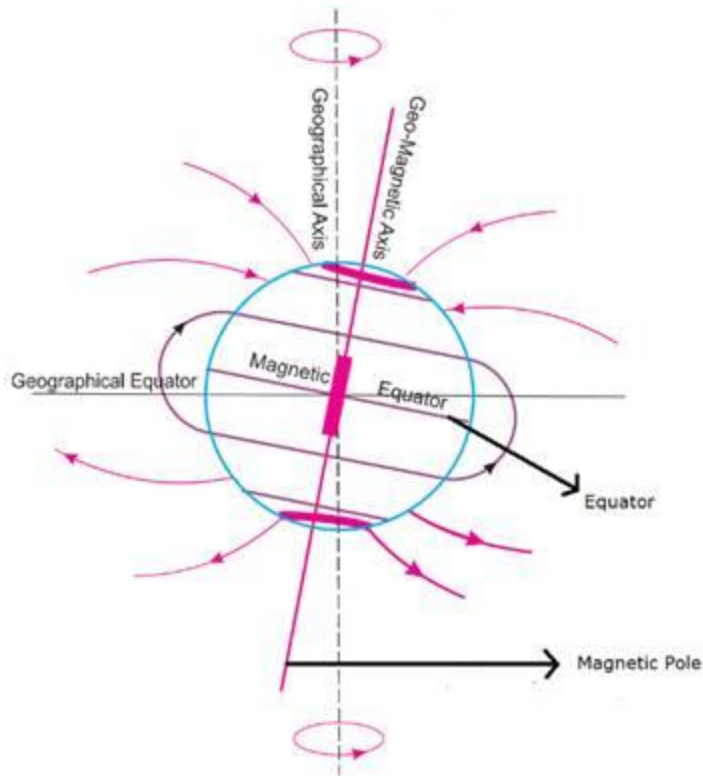
The mantle is the layer beneath the earth's crust. It is the biggest part of the Earth comprising more than 85% of the Earth's mass. The upper mantle is in a liquid state. It is extremely hot, creating convection currents which are responsible for the movement of plates.

The core is the innermost layer of the earth. It consists of outer core and inner core. The outer core is made up of liquid state and inner core is made up of solid state. The core is mostly made up of iron and nickel. Earth's core is responsible for the generation of the magnetic field, which protects from the high energy particles of solar wind.

Q. 4. B. Draw neat diagrams, label them and explain.

Magnetic pole and equator.

Answer :



The magnetosphere is the region of space surrounding earth where the dominant magnetic field is the magnetic field of the earth, rather than the magnetic field of interplanetary space. North Pole and South Pole are the two magnetic poles of the earth. The magnetic poles of the earth are different from geographical poles as shown in the above figure.

Equator is an imaginary line along the middle of the Earth at an equal distance from the North Pole and South Pole.

Q. 5. A. Give geographical reasons:

There are discontinuities in the interior of the earth.

Answer : The discontinuities in the interior are boundaries between crust, mantle, and inner core. They also exist within crust, mantle, and core.

Discontinuities are formed due to variation in the composition of the earth's interior at different layers. Each of these layers consists of materials having a distinct composition, physical and chemical properties. For instance, Conrad discontinuity exist within earth's crust because the Continental crust is made up of silica and aluminum and Oceanic crust is made up of silica and magnesium.

Q. 5. B. Give geographical reasons:

There is correlation between the density of metals and their location in the interior of the earth.

Answer : Earth's interior is not uniform and consists of different materials with different physical and chemical properties. As it is known that the materials with less density float over the materials with large density, the stratification of the earth's interior also holds the same. The crust is the outermost layer of the earth because it is lighter than mantle and core. The core is the innermost layer and has a density greater than crust and mantle.

Q. 5. C. Give geographical reasons:

Mantle is the centre of earthquake and volcanic eruptions.

Answer : The Mantle is the layer beneath the earth's crust. The upper mantle is called asthenosphere. Which is in a liquid state. In this layer, the rock material deforms more readily, and magma formation takes place. The internal energy released due to endogenic movement caused in the mantle is responsible for earthquake and volcanic eruptions.

Q. 5. D. Give geographical reasons:

The thickness of the crust below the continents is more as compared to oceans.

Answer : The width of continental crust varies between 35-40 km whereas the width of oceanic crust is between 7-10 km. Orogeny takes place on the continental crust which creates mountains and thickens the crust. More mass accumulates with time which eventually increases the width of continental crust.

Q. 5. E. Give geographical reasons:

Earth is protected because of the magnetosphere

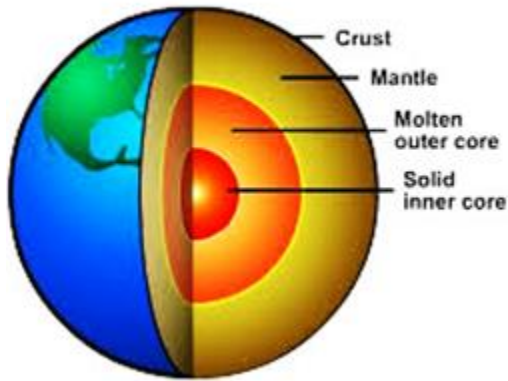
Answer : The magnetosphere is the region of space surrounding Earth where the dominant magnetic field is the magnetic field of Earth. This magnetic field protects the earth's atmosphere from the harmful solar winds coming from the sun. These solar winds consist of high energy particles which have the potential to disrupt the earth's communication system.

Activity

Q. 1. Prepare a model of the earth's interior.

Answer :

Cross Section of the Earth



Intext Questions

Q. 1. When an earthquake occurs, what happens exactly?

Answer : An earthquake is the sudden shaking of the earth which is caused when the two blocks of rocks or two plates are rubbing against each other or strikes one another in the interior of the earth. It results from the sudden release of energy in the earth's lithosphere that creates seismic waves.

Due to the striking of the plates trembling is caused on the surface of the earth. Exactly when an earthquake strikes, at the earth's surface earthquakes manifest themselves by shaking and displacing or disrupting the ground.

When the epicenter of the earthquake is located in the sea, the seabed may be displaced sufficiently to cause a tsunami.

Q. 2. How are igneous rocks formed?

Answer : Igneous rocks are one of the three types of rocks, others being sedimentary and metamorphic rocks, which are formed during a volcanic eruption. These rocks are formed through the cooling and solidification of magma or lava which comes out when a volcano erupts. Solidification into rocks occurs either below the surface which is known as intrusive rocks or on the surface which is known as extrusive rocks.

Q. 3. What is a volcano?

Answer : A volcano is a mountain or hill, conical in shape and has a vent or hole called crater through which lava or magma, gases, rocks, and fragments come out. In other words, it is a rupture in the crust of the earth and not only of the earth but also on other celestial bodies. When the material escapes, it causes an eruption. An eruption can be explosive, sending material high into the sky or it can be calmer with gentle flows of the material.

Q. 4. Which materials come out during a volcanic eruption?

Answer : The volcanic areas usually form mountains built from the many layers of rock ash or other material that collect around them. During a volcanic eruption, the materials which come out or are ejected into the earth's atmosphere and onto the earth's surface are hot magma or lava, gases, steams, cinders, gaseous sulphur compounds, ash, and broken rock pieces. Lava bombs and pyroclastic material are also thrown out by a volcano when it erupts.

Q. 5. In which state of matter are these materials?

Answer : There are five known phases or states in which the material comes out. The matter or material which comes out of a volcano during a volcanic eruption is either solid like rocks and other solid fragments or liquid which is molten magma or lava or gases like gaseous sulphur compounds and in the form of water vapors like steam.

Q. 6. Are these materials cool or hot? Why?

Answer : All the materials are hot. The primary material which comes out of a volcano is lava. It is extremely hot and molten in the state. All other materials which come out of a volcano like steam gases, gaseous sulphur compounds and broken pieces of rocks are also very hot and have a heat radiating effect to long distance.

The temperature of the erupted or ejected materials is very high because deep within the earth it is so hot that some rocks melt and slowly becomes a thick flowing substance called magma.

Q. 7. Can we dig deep from one side of the earth and come out from the other side? Write your imaginations in your notebooks and discuss in class.

Answer : It is very impractical to think of digging a hole into the earth of such a depth that we can come out of the other side.

There is a lack of oxygen deep within the layers of the crust. To make the journey possible to some extent one has to carry the source of oxygen which must be enough to cover such a large distance inside the earth.

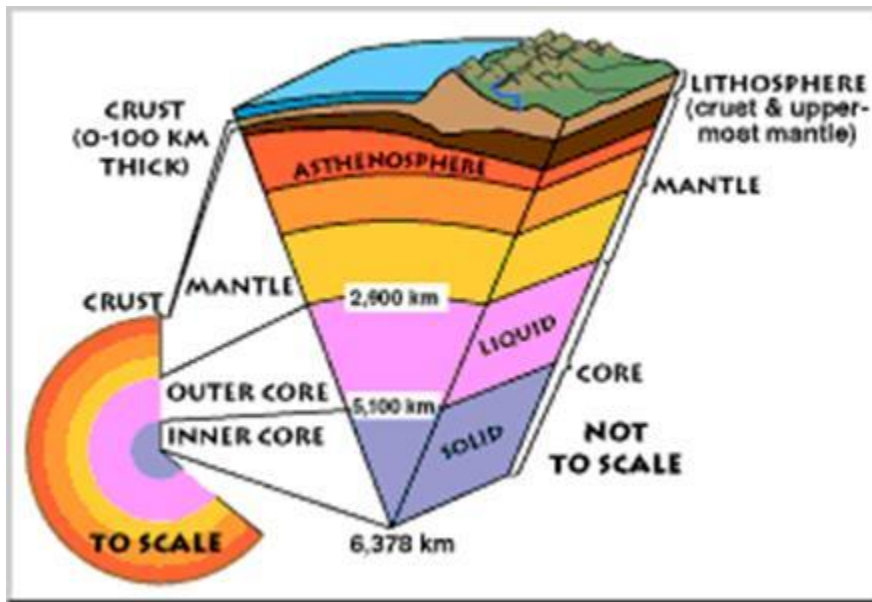
Moreover, the temperature is too high below the surface of the earth. The tunnel will collapse just a few miles underground due to high pressures on rock walls, and the person will get stuck there. If one enters a hole which digs deep into the surface then surely his or her life will be in danger. The person would risk his life and will die.

The high-pressure liquid iron in the core would flood into the tunnel, and maybe the person has to swim through it which is not possible unless until the person has insulating protection.

Hence there are no possible ways to fight the natural conditions of the earth's surface and dig out hole starting from one end to come out of the other side.

Q. 8. Imagine the earth's interior and write 10-12 sentences on it.

Answer : Given below is the diagram of the interior of the earth which shows different layers inside the earth:



Structure of the earth:

1. The earth is believed to have a solid inner core made mostly of iron and nickel.
 2. The diameter of the core is estimated to be 7000 km compared with a 12,700 km diameter of the entire planet.
 3. The crust is only a few tens of kilometers thick.
 4. The region between the core and the crust is called *the mantle*. It is composed mainly of solid materials of the earth.
 5. The upper part of the crust and the mantle together are called *lithosphere*.
- One would experience a high pressure which is at the center of the earth and extremely high because of all of the weight of the entire planet pushing inwards onto it.
 - If one happens to be inside the surface of the earth or the interior of the earth one would observe that it is made up of a series of layers that sit below the surface crust. One would observe that these layers include the solid but flowing mantle, the liquid outer core, and the solid iron outer core.

- The outer core has so much heat and pressure that the rocks have melted in the current years. The increased heat and pressure are great that the iron and its alloys have become solid in the inner core.